



The NESUS project start-up

by Jesus Carretero, Project Coordinator

Dear readers,

We are very excited to present the first newsletter of the new NESUS COST Action (IC1305). The newsletter will provide you with information about the progress, recent achievements, and important forthcoming activities related to sustainability in ultrascale computing systems. In this first newsletter, we also introduce the NESUS COST Action to you. More information is provided on our website www.nesus.eu.

The goal in scalable and sustainable technology today is to have on the one hand large parallel supercomputers, named Exascale computers, and on the other hand, to have very large data centers with hundreds of thousands of computers coordinating with distributed memory systems. Ultimately, NESUS idea is to have both architectures converge to solve problems in what we call ultrascale. Ultrascale systems combine the advantages of distributed and parallel computing systems. The former is a type of computing in which many tasks are executed at the same time coordinately to solve one problem, based on the principle that a big problem can be divided into many smaller ones that are simultaneously solved. The latter system, in both grid and cloud computing, uses a large number of computers organized into clusters in a distributed infrastructure, and can execute millions of tasks at the same time usually working on independent problems and big data. The applications of these systems and the benefits they can yield for society are enormous, according to the researchers, who note that this type of computing will help conduct studies about genomics, new materials, simulations of fluid dynamics used for atmospheric analysis and weather forecasts, and even the human brain and its behavior.

The scientific objective of NESUS is to study the challenges presented by the next generation of ultrascale computing systems to enhance their sustainability. These systems, which will be characterized by their large size and great complexity, present significant challenges, from their construction to their exploitation

and use. We try to analyze all the challenges there are and see how they can be studied holistically and integrated, to be able to provide a more sustainable system. The challenges that this type of computing poses affect aspects such as scalability, the programming models used, resilience to failures, energy management, the handling of large volume of data, etc. One of the NESUS goals is to find the way that all solutions that are proposed can be transmitted to user applications with the minimum possible redesign and reprogramming effort.

The project began a last March with 29 European countries, but at present consists of 39 European countries and six countries from other continents. It now involves nearly 200 scientists, almost 40% of whom are young researchers, because one essential goal of these Actions is to promote and create an ecosystem of scientists who can work on these matters in the European Union in the future.

The project have already held two important meetings: one for work groups in Madrid in July and another in Oporto (Portugal) at the end of August, attended by representatives of the research groups that participate as well as Project Officers from the EU's H2020 program. By reducing duplication of work and providing a more comprehensive vision of all the researchers, this COST Action hopes to increase the value of these groups at the European level, promoting European leadership in this area of knowledge, as well as enhancing its impact on science, the economy and society.

This Action, which concludes in 2018, aims to produce a catalogue of open source applications that are being developed by the members of the Action and which will serve to demonstrate new ultrascale systems and take on their main challenges. In this way, anyone will be able to use these applications to test them in their systems and demonstrate their level of sustainability.



Message from Dissemination Chair

by Ivona Brandić

Dear readers,

We are pleased to present the first newsletter of NESUS cost action. In this issue you will find short presentation of the cost action written by Jesus Carretero who is the project coordinator. We report also about the first NESUS WG meeting in Madrid and about the first NESUS workshop held in Porto. Further, we present research highlights including descriptions of the WG 1, 2, and 4. First joint research results between the University Innsbruck and SZTAKI Budapest are presented as well as the abstract of the PhD theses of the PhD students involved in the action. I would like to thank Davor Davidovic, IRB, Zagreb, Croatia for assembling all the contributions and I hope that you will enjoy the readings.

News from the Action



NESUS First WG Meeting

7-8 July 2014, University Carlos III of Madrid, Spain

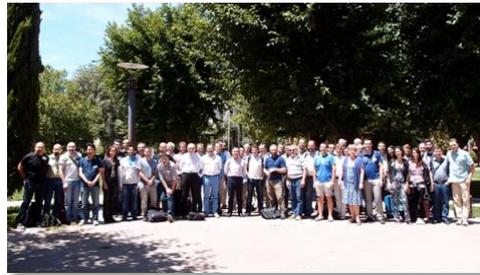


The First NESUS Working Groups Meeting was held in Madrid on 7-8 of July 2014 at the Engineering School of University Carlos III of Madrid (Spain).

More than 70 members of the Action attended the meeting, which the main goal of presenting their activities to other research groups and to coordinate Action research activities into each working group. The participants were welcomed by Prof. Jesus Carretero, Action Chair, and by Rosa del Ser, Grant-Holder administrative for this Action. Jesus Carretero presents the Action to all attendees, including objectives, scientific plan, organisation and management, Chairs and WG leaders, activities foreseen and working method, making emphasis on the importance for the Action of including Early Stage Researchers (ESR) and promoting gender balance. Emmanuel Jeannot, Vice-chair of the Action, presents the Application portal that will be used in the Action to collect applications amenable for ultrascale computing.

The meeting was organized as a plenary during the first day, to facilitate exchange of ideas. A good number of brief technical presentations were made by the attendees to the plenary to allow a better knowledge of the groups and to look for synergies.

Along the second day, parallel sessions were held for every working group to look for synergies, deciding on work topics and near future actions. Those sessions allowed the WG leaders to organize future scientific activities, planning of the deliverables and report, future joint publications. The WG members also proposed to create some focus Groups to strength work in specific



activities as monitorization tools, benchmarks, or high productivity systems. They also elected the working group steering board (SB) members. After finishing, the WG leaders presented a brief summary of the parallel sessions of each WG.

Ivona Brandic showed the Dissemination activities made and foreseen, such as participation in several workshops at Europar (Heteropar, TASUS, and APCIE). Davor Davidovic, was elected as Newsletter Co-Editor. The format for the Action Workshop in Porto, August 27-28 was also approved.

Maya Neytcheva made the presentation of the STSM open call for first year of the Action. At least 4 STSM were coordinated in this meeting.

To close the meeting, The Action Chair encouraged members to look for synergies and to take quick steps towards cooperation and implementation of decision taken.

by Jesus Carretero



NESUS Workshop

27-28 August 2014, University of Porto, Portugal



Last August, on 27th and 28th, the city of Porto received the first Nesus workshop and the third Management Committee meeting. Both events occurred at the University of Porto, Faculty of Engineering.

The workshop was started by Prof. Jesus Carretero, Chair of the action, that made an update of the action activities and presented the workshop program. The first track was fulfilled by two invited speakers, Dr. Andrea Feltrin and Professor Stefano Markidis. Dr. Feltrin is a Project Officer and DG Connect of the European Commission, and made a presentation about Future and Emerging Technologies (FET) Work Programme for 2014-2015 in H2020. The following issues were addressed: FET mission and funding scheme; FET-Open: fostering novel ideas; FET-Proactive: High-

Performance Computing; and Overview of HPC calls outside FET. Professor Markidis, from KTH Royal Institute of Technology, Stockholm, Sweden, gave an insight talk about the challenges of running Scientific Applications at

Exascale, where he emphasized the importance of synchronization in such systems. Additionally, Prof. Markidis explained that, in the future, the cost of moving data will become predominant, and surpass the cost of computing.

To conclude the presentation, Prof. Markidis presented a Roadmap to Exascale, that includes the reformulation from domain decomposition to tasks, from time driven simulations to event driven simulation and, from stencil applications/domain decomposition to large graph problems that arises from task formulations.

The rest of the workshop included a poster session and 29 presentations of NESUS members addressing the working groups themes that cover programming models and languages, resilience, data management, energy efficiency and applications.

by Jorge Barbosa and Ricardo Morla

Research Highlights

Work group 1: Focus Group - High Productivity Computing

by Zorislav Šojat and Karolj Skala

Inside the NESUS WG₁ the Focus Group on High Productivity Computing has been established. Its main aim is to explore the possibilities of an integrative approach which would allow a significant shortening of the time lapse between the human ideas or needs and computer implementation solutions.

The major idea is that computers, as being more and more inseparable part of our whole society and civilization, have to be user friendly, and the notion of High Productivity in this sense encompasses the productivity of any human necessitating help from information processing and computing equipment, whatever their needs be. This is the idealistic aim towards which this Focus Group has to try to steer itself.

There are several explicit objectives of the Focus Group High Productivity Computing. On the highest level, the main objective of the Focus Group is the comparative exploration of past and present day tools, methodologies, languages, algorithms and hardware in view of the information processing and computing needs and necessities perceived now and, as much as possible, projected into the future. An extremely important aspect of this is historical research into avenues of computer science

taken, but not persued. The exploration of the concept of High Productivity Computing, or, maybe better to say, High Productivity Information Processing and Computing is to be performed, as the concept of Productivity is changing through time to encompass some aspects and put less significance on other aspects of the processes involved. The central objective of the Focus Group is the development, definition and standardization of a universal (linguistic) environment from the level of (new) hardware up to the level of algorithmic expression of complex algorithms involving a wide spectrum of available information processing and computing equipment. Finally, on practical level the aim is to build team(s) for project proposal application(s) to FET or other H2020 calls, enabling the embodiment of the Focus Group's aim in real hardware and software.

Through these four main objectives the Focus Group will act integratively, developing and demonstrating a viable new approach towards the design of and interaction with information processing and computing equipment. Therefore a call is made to all who wish to collaborate in reviewing and forming opinions and conclusions or solutions on the subject of High Productivity Computing.

Work group 4 – Sustainable data management

by Angelos Bilas and Toni Cortes

Future scalable systems will require sustainable data management for addressing the projected exponential growth and complexity of digital information. WG₄ examines data management lifecycle on scalable architectures in a synergistic approach combining HPC and distributed computing. The goal of this WG is to explore and re-think the relationship between the data management lifecycle and scalable architectures for the next generation of computing platforms. Significant emphasis is placed on the cross-fertilization between HPC and distributed computing in addressing challenges such as scaling the performance of the current I/O stack, exposing and exploiting data locality, achieving energy efficient data management, improving the scalability of big data applications and data analytics. Additionally, Nesus is aiming to build a multi-disciplinary environment by attracting applications scientists from different domains who face big data problems. WG₂ has already initiated collaborative activities and welcomes proposals for new collaborations among participating partners and scientists. WG₄ is co-led by Prof. Angelos Bilas (FORTH, Greece) and Prof. Toni Cortes (BSC, Spain).

Work group 2 – Programming models and runtimes

by Alexey Lastovetsky and Georges DaCosta

Working Group 2 (Programming models and runtimes) will promote new sustainable programming and execution models in the context of rapidly changing underlying computing architecture. The participants will explore synergies among emerging programming models and runtimes from HPC, distributed systems, and big data management communities. The efforts will focus on improving the programmability of future systems that are likely to reach substantially higher levels of concurrency and have heterogeneous architectures. This WG will explore programming models and run-times that facilitate the task of scaling and extracting performance on continuously evolving platforms, while providing resilience and fault-tolerant mechanisms.

To help share the point of view on different programming models, an effort led by Jose Daniel Garcia will be done to produce a Rosetta Stone. In collaboration with WG6, WG2 will select a few simple benchmarks and will express them using different programming models. One of the most important characteristics of these micro-benchmarks will be their scalability expressiveness.

An effort is undertaken (led by Pierre Kuonen) to compose an inventory of the runtimes and programming models developed and studied by Nesus participants. One key concern is that monitoring is needed from models to runtimes. One of the first activities will be to share common practices and software in this field, and afterward to evaluate how the current state of the art of monitoring can



be applied at large scale.

Concerning topics, several were raised by participants and could be interesting as future subject for discussions:

- Scheduling taking into account dynamic heterogeneous infrastructure
- Large scale monitoring
- Expressing complex metrics and complexity (not only performance, but also maintainability, scalability, energy,...)

The first tutorial will be organized in conjunction with one of the Nesus summer schools with PhD students and novices as the audience. One proposal is to have a particular problem/algorithm and implement it in different groups using several paradigms. As an example, Map-Reduce and MPI were proposed. The goal would be to have a sort of competition in order to evaluate which is the more scalable.

The Monograph

"Personal Supercomputers: Architecture, Design, Application"

The book* covers whole scope of questions of design, operation and application of high performance computing systems based on general-purpose computers and hardware accelerators. There are shown technologies and tools of high-level design of application-specific processors for reconfigurable hardware accelerators, examples of the application of these technologies and practical implementations of application-specific processors. Questions of the interaction of general-purpose computers and hardware accelerators are disclosed. Prospects of high-performance computing systems based on general-purpose computers and hardware accelerators are highlighted.

The book is the result of years of research work of the authors in the field of application-specific processors development and the creation of methods and means of their high-level design. It is aimed at experts in the field of computer and information technology, teachers and undergraduate and postgraduate students of higher educational institutions.

* Anatoliy Melnyk, Viktor Melnyk. Personal Supercomputers: Architecture, Design, Application. Lviv Politechnic National University Publishing, 2013. - 519p. (published in Ukrainian language)
Action was formally publicized there, gaining some interests and new potential participants.

Results from the Action Collaboration

Joint paper between UNI Innsbruck (Austria) and SZTAKI Budapest (Hungary)



by Radu Prodan

University of Innsbruck together with SZTAKI tackled the resource provisioning problem from a new angle never considered so far in the community by addressing the user behaviour. Their work is based on the main observation that academic cloud infrastructures are constructed and maintained so they minimally constrain their users who jeopardizes fair and flexible resource use with negative impacts on the overall utilisation and energy consumption. To encourage commercial-like user behavior preventing resource waste, they propose an architectural extension to existing academic infrastructure clouds that uses leader boards to ignite competition between academics and reveal their worst practices, including energy consumption. As leader boards are not sufficient to completely change user behavior, they introduced engaging options that encourage academics to delay resource requests and prefer resources more suitable for the infrastructure's internal provisioning. Evaluation results based on real-life traces show a potential resource utilization reduction by the factor of at most 2.6 while maintaining the unconstrained property of academic clouds.



TASUS 2014 workshop

TASUS 2014 workshop on techniques and applications for sustainable ultrascale computing systems, took place in Porto, Portugal, collocated with EuroPar 2014 conference (details can be found at:

<http://http://www.arcos.inf.uc3m.es/~tasus/>).

It was a half-day workshop where 5 papers were selected, out of 11 submissions, and that will be published in the EuroPar Workshop Proceedings by Springer-Verlag in LNCS Series. The workshop was organized by the members of the NESUS action, and many members of the

Special issue of Euro-par workshops organized by NESUS members



This year Euro-Par, one of the major conference in parallel and distributed system took place in Porto from August 25 to August 29. The first two days are devoted to specialized workshops. Among the featured workshop of this year edition, three of them were chaired by Nesus members:

- the workshop on Applications of Parallel Computation in Industry and Engineering (APCIE 2014), chaired by Raimondas Ciegis and Julius Zilinskas,
- Techniques and applications for sustainable ultrascale computing systems (TASUS 2014) chaired by Jesus Carretero, Domenico Talia, Gudula Ruenger, Laurent Lefevre, and,
- The twelfth International Workshop on Algorithms, Models and Tools for Parallel Computing on Heterogeneous Platforms (HeteroPar'2014) chaired by Emmanuel Jeannot.

These workshop gathered high quality papers that were presented during the sessions and will be published in a dedicated LNCS proceedings. We have decided to call for extended versions of the article and have them published in a special issue of Concurrency and Computation, Practice and Experience (CCPE). The call for paper is available here: <http://www.ccpe.net/journalinfo/issues/2014.html#HeteroParAPCIETASUS2014> and the deadline for submitting the first version is October 31.

We are all very excited by this opportunity to demonstrate the vitality of our community and the quality of the research carried-out in the scope of the NESUS COST Action.

programme committee were NESUS members, as the topics were completely aligned to the COST Action. It was the edition of the Workshop, but a new edition will be proposed for EuroPar 2015 extending it to a full day workshop. Extended papers from this workshop will be published in a special issue of the journal Concurrency and Computation: Practice & Experience (CCPE).



Keynote at EuroMPI/Asia 2014 conference and ESAA 2014 workshop.

Prof. Jesus Carretero presented NESUS Action as part of an invited talk related to sustainability in computing systems. This year, the 21st EuroMPI conference was held in Asia for the first time, which was reflected in its name. The number of attendees was over 100, with four keynote speakers, 2 tutorials and 2 workshops. Most topics were centered on Exascale systems, making emphasis on the scalability, performance, and applications. Other keynote speakers were Katie Antypas (NERSC), Yutong Lu (Tianhe-2), and Mitsuhsa Sato (RIKEN A), which presented major initiatives towards Exascale computing in their countries.

Members of NESUS action organized the International Workshop on Enhancing Parallel Scientific Applications with Accelerated HPC (ESAA 2014) as part of the EuroMPI/ASIA 2014 activities. The workshop was aimed to explore the state of the art of developing applications in accelerated massive HPC architectures, including practical issues of hybrid usage models with MPI, OpenMP, and other accelerators programming models. It has two invited speakers, Prof Hiroshi Nakashima, which talked about the Manycore challenge in Kyoto and the experience learned from HPC programming in the XC30 supercomputer, which has Xeon Phi KNC processors, and Prof. Taisuke Boku, that presented XcalableMP (XMP) parallel programming language for distributed memory architecture for PC clusters to MPP, and its features enhancing its capability to include accelerating devices for heterogeneous parallel processing systems, and a new technology for inter-node GPU direct communication named TCA (Tightly Coupled Accelerators) architecture network.

News from C4BIO 2014 workshop



The workshop took place in conjunction to CCGrid 2014 in Chicago on May 26th. The aim of the workshop was to promote the synergies of the cloud computing and bio communities by exploring applications developed in clouds, cloud systems enhancements for bio, and new trends and needs shared between both communities. Thus, this workshop presented articles that discussed the application of cloud computing to bioinformatics and biomedicine, including solutions to area problems and architectural adaptation of cloud systems to fit those problems. The workshop had the collaboration of two keynote speakers and 10 papers was presented. Prof. Jesus Carretero presented the NESUS action, including objectives, the working groups involved, activities, and dissemination plans.

News from HPCReS workshop

HPCReS 2014, workshop on HPC research services, is taking place in Timisoara, Romania, in 23-24 September, in conjunction with SYNASC 2014 symposium (details can be found at:

<http://host.hpc.uvt.ro/events/hpcres-2014-international-workshop-on-hpc-research-services/>).

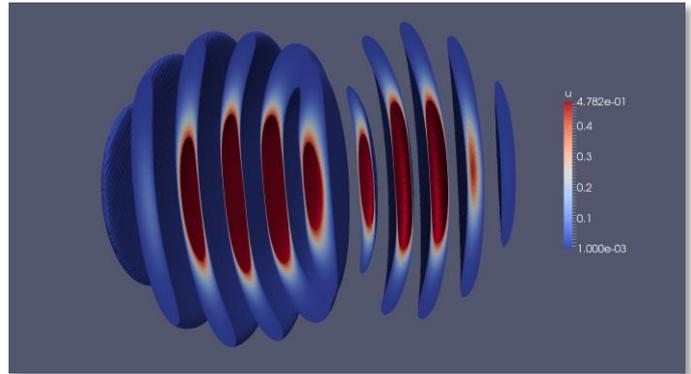
More than half of the members of the programme committee are NESUS members and the topics are aligned with the ones of NESUS. Seven papers were selected to be presented and published in the conference proceedings edited by IEEE Computer Press (one paper from a NESUS member team). The workshop will start with a GPU training sustained by Adrian Jackson from EPCC, Edinburgh. It is organized by the FP7 HOST project team (<http://host.hpc.uvt.ro>). The previous event organized by the same project and team in July 2014, namely the Workshop of e-infrastructure services for society, has included a NESUS presentation (slides available on the project/event web site), underlining the STMS opportunities for the teams represented at the event.

The STSM visit of **Michael Quell** (TU Vienna) to University of Tartu, Estonia

When I arrived in Tartu, it was warm and the sun was shining, both signs for a great summer. I spent two weeks trying to learn Estonian and enjoying Tartu. Living in student dormitory is not the best you can imagine, but a good place to meet new people. The Faculty of Mathematics and Computer Science of the University of Tartu is located on Toome Hill, probably the second highest hill in Estonia. The building is not air-conditioned so it gets really hot in the summer.

Using GPU's for parallel programming is on the way becoming mainstream. Therefore I decided to learn OpenCL and compare CPU and GPU performance on solving the Gray-Scott equation in 2d. That was not an easy task. It took me about a week to get my first "Hello World" program to run on a GPU. Nevertheless next thing to do was to port the Fortran simulations to C, because OpenCL officially supports only C and C++.

After that you also need a big machine to run the code on, therefore we decided to build an APU-Cluster with 4 nodes. Each of the nodes has an AMD A6 6400K APU, and 4 GB of ram. The APU provides us with a powerful, low energy costing GPU we want to do our computations. They are connected with GB-Ethernet and a GB-Switch, though



we might try to connect them with USB 3.0 to open the bottle neck. The operating system is Debian-Wheezy. I paused working on the OpenCL-code because the poster about inSitu visualization, also known as Coprocessing, which I wanted to present on the ESSCaSS 2014 needed to be finished. Paraview is used to do the visualization.

The Summer School took place in Roosta Holiday Village and most of the participants were from Estonia. Overall the given talks were interesting. The discussed topics were visualization, program security and communication security and most of all machine learning.

When I arrived in Tartu again it was time to build the cluster. It took one and a half days to set the system up, mostly because latest AMD drivers are difficult to install. Help from all parts of the institute was appreciated. The code was rewritten with MPI to support distributed memory and also tested on Beacon.

Short Abstract of PhD Thesis

Self-Configurable High-Performance Computer Systems, Viktor Melynk

The dissertation thesis, abstract of which is presented below, is the background of the project titled "Improvement of heterogeneous systems efficiency using self-configurable FPGA-based computing» that is the part of the NESUS Action, and that was presented at the NESUS Action Workshop and MC Meeting in Porto, Portugal, on August 27-28, 2014. Dissertation "Self-Configurable High-Performance Computer Systems" was defended by Viktor Melnyk, Doctor of Technical Sciences, Ph.D., Associate Professor at Department of Information Technologies Security in Lviv Polytechnic National University, Lviv, Ukraine, on June 21, 2013.

This thesis is dedicated to development of the theoretical foundations, methods and means of design and operation of a new class of high-performance computer facilities – self-configurable FPGA-based computer systems (SCCS) and their components, their study and implementation. Theoretical foundations of operation and ways for improvements in the reconfigurable computer systems architecture are developed and explored. The problems, hindering these systems effectiveness, are identified, and methods to solve them are proposed. Theoretical principles of design and operation of the SCCS, which include the proposed improvements, are developed. Characteristics of information processing duration in the SCCS are investigated and SCCS's fundamental advantages over the reconfigurable ones are proved. Principles of structural organization of the SCCS and conceptual bases of their components design are developed. Design, research and implementation of the software for the SCCS's components interaction are done. An implementation and experimental study of the SCCS and their basic components are performed.

Energy-Aware Techniques and Location-Based Methodologies in Mobile Environments, Deborah Falcone

Mobile computing emerged in recent years as a primary technological area because of the large increase of computing capability and connectivity of mobile devices. Billion of users around the world depend on their mobile phones for their private and professional lives. This trend has led to the exponential growth of mobile applications and pervasive digital data. However, this has come at the cost of increasing energy consumption. The limited battery-power of mobile devices still prevents a wider use of these devices.

To make the most of all available resources, we focused on the problem of ensuring energy efficiency to meet the needs of energy-hungry modern applications and to enable effective and reliable computing over mobile devices that collaborate each other. After the design and implementation of the methodology to conservatively consume energy, we expect to manage the explosive mobile data volume coming from these devices. In particular, we focused on mobile geo-tagged social data, that is data posted on social networks, tagged with geographical coordinates collected through the GPS interface of users smart phones. The ability to associate spatial context to on line posts is allowing collecting a huge amount of social data, which although collected on line, incorporates information about the actions of people in real life. We worked to develop novel applications to reconstruct user mobility patterns useful for urban planning and management in the context of smart cities.

Scalable GPU-based Eigensolvers for Dense Symmetric Problems, Davor Davidović

This dissertation is conducted as a joint research between two NESUS partners, Ruđer Bošković Institute (Croatia) and University Jaume I (Spain). The aim of the thesis is to develop algorithms solving large dense symmetric eigenproblems on the hybrid CPU-GPU based architectures. In particular, it aims at developing the scalable eigensolvers in the sense that they exhibit very high performance even if a problem is out-of-core from the GPU perspective. To solve such problems, an approach that applies blocking strategy and re-designs the existing eigensolvers, in order to hide the latency and decrease the number of data transfers between the main memory and the GPU memory, is presented. This approach designs and implements a set of the block-oriented, communication-avoiding BLAS routines that overlap the data transfers with the number of computations performed. The developed routines are then applied to speed-up the following eigensolvers: the solver based on the multi-stage reduction to a tridiagonal form, the Krylov subspace-based method, and the spectral divide-and-conquer method.

The proposed out-of-core eigensolvers are evaluated and compared on real problems that arise in the simulation of macromolecular motions. The results presented in the dissertation show that the developed eigensolvers, for a set of the specific macromolecular problems, significantly overcome the multi-core variants and attain very high flops rate even if data do not fit into the GPU memory. The research conducted in this dissertation is matching some of the objectives of the NESUS action, such as scalability, optimal usage of resources, and programming the heterogeneous architectures (specifically hybrid CPU-GPU based architectures).

Announcements

A new release of Chameleon © C2HDL tool from Intron ltd

On August 2014 Intron ltd released an improved version of Chameleon © – C2HDL tool that has now significantly reduced time of HDL code generation. Major features of Chameleon © are ability to generate HDL description having on input ANSI C description of the algorithm, and that uses new computer architecture and a new multiport computer memory with parallel conflict-free access to data. The developer, specifying an algorithm of the data processing on ANSI C, gets on return fully debugged and synthesizable VHDL RTL model of the device that implements given algorithm. The architecture of the device

is fully optimized and maximally uses ability for executed algorithm parallelisation.

Intron is now searching for the orders on FPGA implementations of application-specific processors to be generated. On the next steps in Intron are planning to put their Chameleon © into SaaS (Software as a service) platform to make it available for a wide range of customers over the world. For more information please visit www.intron-innovations.com.

The Chameleon © was briefly discussed at the presentation titled "Improvement of heterogeneous systems efficiency using self-configurable FPGA-based computing» at the NESUS Action Workshop and MC Meeting in Porto, Portugal, on August 27-28, 2014.

CALL FOR PAPERS: Special Issue on Techniques And Applications For Sustainable Ultrascale Computing Systems

"Simulation Modelling Practice and Theory" (SIMPAT) is seeking original manuscripts for a Special Issue on "Techniques And Applications For Sustainable Ultrascale Computing Systems" scheduled to appear in September 2015.



Guest Editors:

Prof. Helen Karatza. Aristotle University of Thessaloniki, Greece.
Prof. Jesus Carretero. University Carlos III of Madrid, Spain.

Important Dates:

- Submission of papers: **October 30, 2014**
- Communication of first round of review results: **January 15, 2015**
- Submission of revised manuscript: **March 15, 2015**
- Notification of acceptance: **April 30, 2015**
- Final paper due: **May 31, 2015**
- Tentative Publication date: **September 2015**

The topics of interest, but not limited to:

- Existing and emerging designs to achieve sustainable ultrascale systems.
- Simulation techniques to enhance sustainability of ultrascale computing systems.
- High-level parallel programming tools and programmability techniques to improve applications sustainability on ultrascale platforms.
- Energy efficiency techniques for monitoring, analyzing, and modeling ultrascale systems,
- Sustainable resilience and fault-tolerant mechanisms that can cooperate throughout the whole software stack to handle errors.

CALL FOR PAPERS: Workshop on Clusters, Clouds and Grids for Life Sciences

In conjunction with CCGrid 2015 - 15th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing, May 4-7, 2015, Shenzhen, Guangdong, China

This workshop aims at bringing together developers of bioinformatic and medical applications and researchers in the field of distributed IT systems. On the one hand, it addresses researchers who are already employing distributed infrastructure techniques in bioinformatic applications, in particular scientists developing data- and compute-intensive bioinformatic and medical applications that include multi-data studies, large-scale parameter scans or complex analysis pipelines. On the other hand, it addresses computer scientists working in the field of distributed systems interested in bringing new developments into bioinformatic and medical applications.

The goals are to exchange and discuss existing solutions and latest developments in both fields, and to gather an overview of challenges (technologies, achievements, gaps, roadblocks). The workshop further intends to identify common requirements to lead future developments in collaboration between Life Sciences and Computing Sciences, and to collaboratively explore new ideas and approaches to successfully apply distributed IT-systems in translational research, clinical intervention, and decision-making.

Workshop chairs:

Jesus Carretero, University Carlos III of Madrid, Spain
Javier Garcia Blas, University Carlos III of Madrid, Spain
Sandra Gesing, U. Notre Dame, IN, USA
Johan Montagnat, CNRS, France

Important Dates:

Papers due: January 8, 2015
Author notifications: February 15, 2015
Camera ready due: March 15, 2015
Conference: May 4-7, 2015

More info at: <http://lsgc.org/ccgrid-life/>

Topics of Interest (not restricted to):

- Exploitation of distributed IT resources for Life Sciences, HealthCare and research applications
- Service and/or algorithm design and implementation applicable to medical and bioinformatic applications
- Improved energy consumption of bioinformatic
- Modeling and simulation of complex biological processes
- Genomics and Molecular Structure evolution, Molecular Dynamics
- Clouds for big data manipulation in bioinformatics and medicine
- Biological data mining and visualization
- Distributed and heterogeneous bioinformatic and medical data management
- Big Medical and Bioinformatic Data applications and solutions
- Development environments, programming paradigms, and tools for (distributed) bioinformatic applications
- Scientific gateways and user environments for medical and bioinformatic applications



International Journal of Computers & Electrical Engineering SPECIAL ISSUE ON Optimization of Parallel Scientific Applications with Accelerated HPC

Since 2011, the most powerful supercomputers systems ranked in the Top500 list have been hybrid systems composed of thousands of nodes that includes CPUs and accelerators, as Xeon Phi and GPUs. Programming and deploying applications on those systems is still a challenge due to complexity of the system and the need to mix several programming interfaces (MPI, CUDA, Intel Xeon Phi) in the same application. This special issue is aimed at exploring the state of the art of developing applications in accelerated massive HPC architectures, including practical issues of hybrid usage models with MPI, OpenMP, and other accelerators programming models. The idea is to publish novel work on the use of available programming interfaces (MPI, CUDA, Intel Xeon Phi) and tools for code development, application performance optimizations, and application deployment on accelerated systems.

Guest Editors:

Jesus Carretero. University Carlos III of Madrid, Spain.
Javier Garcia Blas. University Carlos III of Madrid, Spain.
Maya Neytcheva. Uppsala University, Sweden

Important Dates:

Submission of papers: November 1st 2014
Communication of first round of review results: January 15th 2015
Submission of revised manuscript: February 15th 2015
Notification of acceptance: April 1st 2015
Publication date: August 2015

The topics of specific interest for this Special Issue include the following:

- Hybrid and heterogeneous programming with MPI and accelerators.
- Performance evaluation of scientific applications based on accelerators.
- Automatic performance tuning of scientific applications with accelerators.
- Integrating accelerators on existing HPC run-times and middlewares.
- Energy efficient HPC solutions based on accelerators.
- Storage cache solutions based on SSD accelerators.
- Real-world scientific and engineering applications using accelerated HPC.

Submission information

Submitted papers must be written in English and must describe original research that has not been published, and is not currently under review by other journals or for conferences. The papers should be submitted via journal's submission website and should adhere to standard formatting requirements. The author guidelines for preparation of manuscripts are available online. Manuscripts should be no longer than 20 pages, including the title page, abstract, or references. All manuscripts and any supplementary material should be submitted through the Elsevier Editorial System (EES) at the location indicated. The authors must choose the Article Type "SI-hpc" at the time of submission.

SUPERCOMPUTING FRONTIERS AND INNOVATIONS AN INTERNATIONAL JOURNAL

SPECIAL ISSUE IN SUSTAINABILITY IN ULTRASCALE COMPUTING SYSTEMS

MOTIVATION

Ultrascale systems are envisioned as large-scale complex systems joining parallel and distributed computing systems that will be two to three orders of magnitude larger than today's systems and that will have to provide cross fertilization among HPC, large scale distributed systems, and big data management. To have more sustainable systems, there is a need to analyze all the challenges holistically providing integrated solutions to leverage all factors.

This special issue provides a dedicated forum to present new research efforts and innovations towards sustainable solutions for ultrascale computing. Topics include new enabling technologies for UCS, system complexity management, new sustainable solutions for system software, new algorithms for expressing a higher level of abstraction at UCS, or new APIs for UCS, among others.

Editors-in-Chief:

Jack Dongarra, University of Tennessee, Knoxville, USA
Vladimir Voevodin, Moscow State University, Russia

Important Dates

Submission deadline: **February 15th 2015**
Publication: **June 2015**

Invited editor:

Jesus Carretero, University Carlos III of Madrid, Spain

More info at: <http://superfri.org/superfri>